NOAA's Climate Change Research Initiative

What is requested? Coincident with the release of the Climate Change Science Program (CCSP) Strategic Plan in July, the Administration announced plans for the acceleration of select high priority research projects and climate observations. These activities contribute to filling critical knowledge gaps identified in the Plan, with emphases on the Carbon Cycle (+$6.5M), Aerosols (+$6.0M) and Ocean Observations (+$10.7M). These investments have been coordinated among the CCSP agencies to maximize the overall impact. Also requested is an acceleration of the Comprehensive Large Array-data Stewardship System (CLASS, +$3.4M) to efficiently archive the vast quantities of satellite and in situ observational data currently being collected and to be collected in the near future.

What are the benefits?

Carbon Cycle - A more accurate representation of the carbon uptake in and around North America will lay the scientific foundation for changing these carbon "sinks," as a potential alternative to controls on emissions**.**
Aerosols - Aerosols are tiny particles in the atmosphere such as soot and dust which can act to either heat or cool the atmosphere, and they represent one of the greatest areas of scientific uncertainty in climate. Because they are also a major issue in air quality, aerosols research will have benefits in this area as well.
Ocean Observations - The heat capacity of the upper three meters of the ocean equals that of the entire atmosphere, so the ocean has a dominant influence on climate. The ocean is also a major reservoir of carbon dioxide. New observing technology allows us to document the ocean's role in climate.
CLASS - This project will provide a seamless data archive portal for the high-volume satellite and ground-based observations that are the basis of the climate record.

Why do we need it?

Carbon Cycle - Presently, we only know the North American carbon sink to within +/-0.6 billion tons/year (Gt), while the entire U.S. emissions is only 1.6Gt. A critical question for decision makers is to what extent can this sink slow the rising levels of atmospheric carbon dioxide in the future.
Aerosols - This research will (i) provide field observations of the effect of aerosols on cloud brightness, (ii) support airborne observations that will link pollutant emissions to aerosol abundance and cloud-altering properties, and (iii) test and improve model simulations of climate change that are needed for "If …, then …" scenarios (i.e., if emission X were to be altered, then the climate change improvement would be Y). These scenarios are at the heart of science-vetted decision-support tools.
Ocean Observations - Improvements to the system will result in reduced uncertainty in estimates of sea level change, reduced errors in the measurement of ocean temperature, and better measurement of ocean carbon storage.
CLASS - Data volume of satellite programs in development such as NPOESS and current observational programs such as the Earth Observing System and the Doppler radar network will outstrip our ability to archive and make them accessible to the science community.

What will we do?

Carbon Cycle - This funding will accelerate deployment of tower- and aircraft-based measurements of the vertical profile of carbon dioxide in North America, and will produce maps of regional sources and sinks of carbon dioxide in the U.S.
Aerosols - This increase will initiate a new five-year observation and modeling-based focus on gaining a better predictive understanding of how aerosols influence climate by their interactions with clouds.
Ocean Observations - This funding will accelerate deployment of moored and free-drifting buoys to measure subsurface temperature and other variables and support shipboard measurement of global distribution of ocean carbon.
CLASS - This increase will continue the development and implementation of a state-of-the-art archive management system, which is integrated with a robust, large-volume, rapid-access storage and retrieval system.